



## **SPAWAR Atlantic – Advanced Law Enforcement Technology Branch**

### ***Law Enforcement License Plate Readers: Lessons Learned in Policy and Practice***

*Sponsored by SPAWAR Atlantic – Advanced Law Enforcement Technology Branch  
National Institute of Justice, Office of Science & Technology*



## Session Moderator

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## Presenters

- Deputy Chief Hassan Aden, Alexandria (VA) Police Department
- Dr. Cynthia Lum, George Mason University

# AUTOMATIC LICENSE PLATE READER TECHNOLOGY



Deputy Chief Hassan Aden  
Alexandria (VA) Police  
Department  
May 3, 2010

# Automatic License Plate Reader Technology

- ❖ Operates 120 MPH passing and closing speeds
- ❖ *Works day or night, in any kind of weather*
- ❖ Reads plates from all 50 states including flat and red character plates
- ❖ *Performs ambiguous searches to improve accuracy*



# Automatic License Plate Reader Technology

- ❖ Alerts within milliseconds if a vehicle is suspect
- ❖ *Features multi-level alarm levels for prioritization—**Wants, Warrants, Amber Alerts***
- ❖ Can be configured with a variety of different camera ranges
- ❖ *Can be configured to remotely alarm to an email recipient*
- ❖ Can operate with data from different sources and be updated on the fly





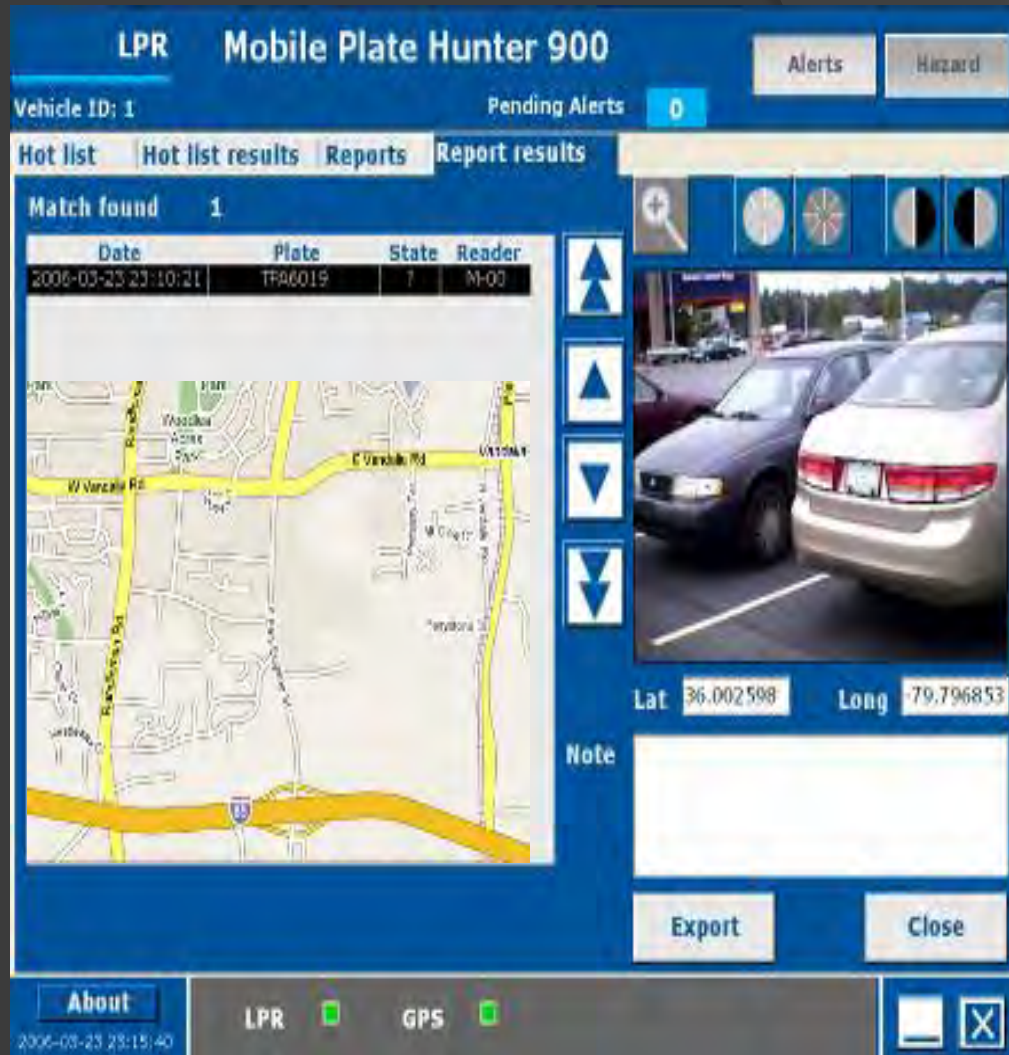
**LPR technology  
can be deployed  
overtly or covertly**





# The Command Center

- Networks all cameras together in one integrated system
  - Mobile systems
  - Fixed systems
  - Covert systems
- Centralizes data to support investigations and intelligence gathering needs
- Alarms transmitted remotely to pagers, cell phones immediately
- Easy Search Functions



# Innovative use of LPR Technology



By law, convicted sex offenders must register with the law enforcement agency in their community. Geo-fencing protects children and alerts law enforcement of violations immediately.



- Hot list can be loaded with all sexual predators in a geographic area.
- GPS coordinates can be set for each school, nursery, etc.
- Radius can be set from plots to create a virtual fence.



Reads tags outside the fence, but alarms within the fence for immediate enforcement.

# Lessons Learned

- Infrastructure assessment
- IT staff needed to set up/maintain equipment and databases
- Distribution of equipment and deployment strategies
- Regional LPR Networks
- Barriers in your organization, government or community

# Questions?

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# License Plate Recognition

*Optimizing LPR Use for Crime Prevention and Agency Legitimacy*

Presenter: Dr. Cynthia Lum (PI)

Research Team: C. Lum, L. Merola, J. Willis, and B. Cave

George Mason University



# Lessons Learned from APD

1. LPR's effectiveness depends on the quality *and* quantity of data it accesses.
2. LPR's effectiveness depends on *how* it is used.

# Evidence-Based Policing & LPR

## ▶ *What we know:*

- LPR is faster, more efficient, and more accurate than the manual approach.

## ▶ *What we don't know :*

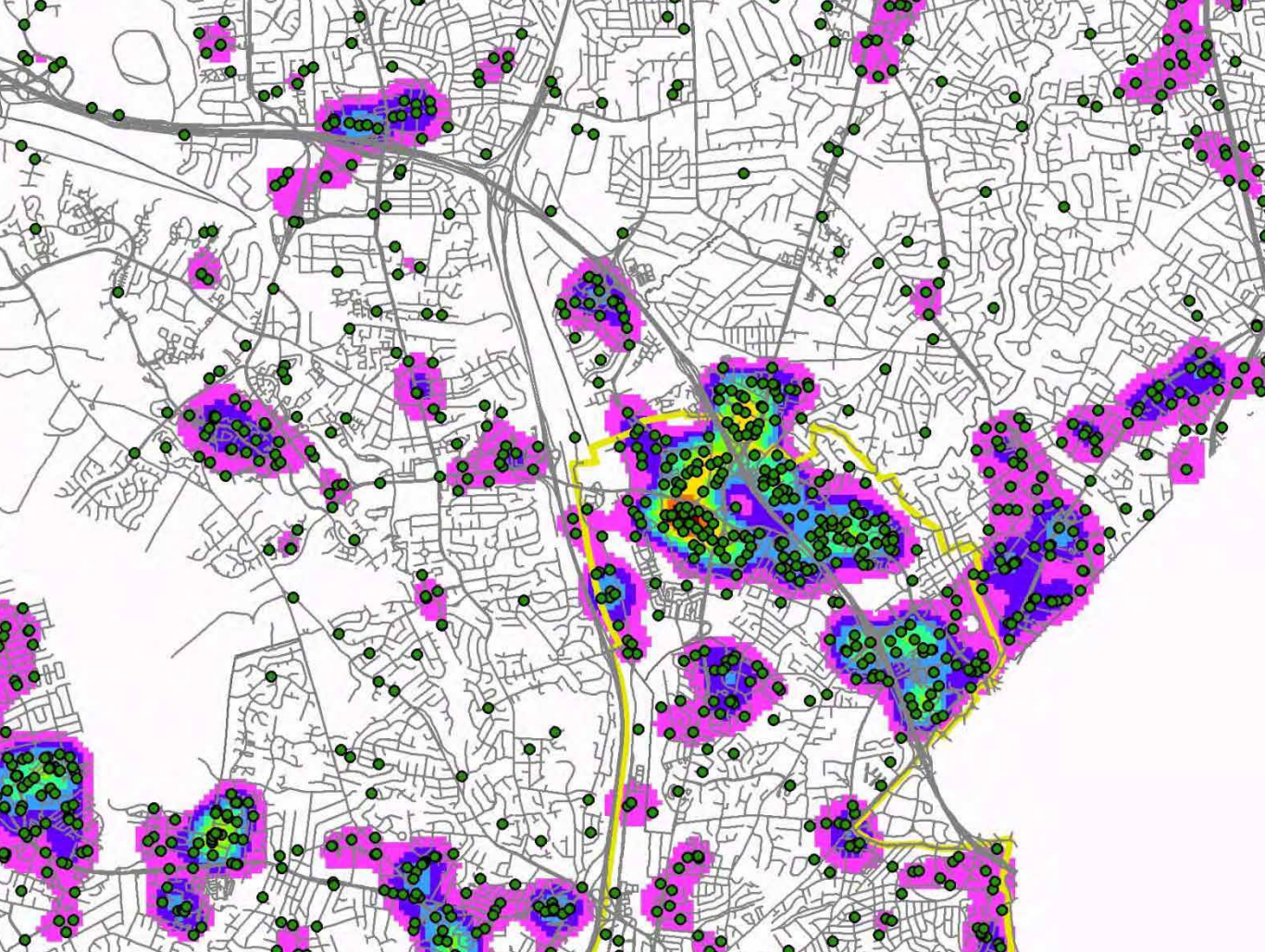
- Whether LPR is effective in reducing crime.
- How LPR use will affect police legitimacy.

# GMU Evaluations of LPR

- ▶ Randomized controlled field evaluations
  - Testing the effectiveness of LPR use at hot spots
  - Replication of PERF LPR experiments, just across two jurisdictions.
- ▶ Legitimacy and legality tests
  - Random sample survey of 2000 households.
  - Scenario testing with legal experts.

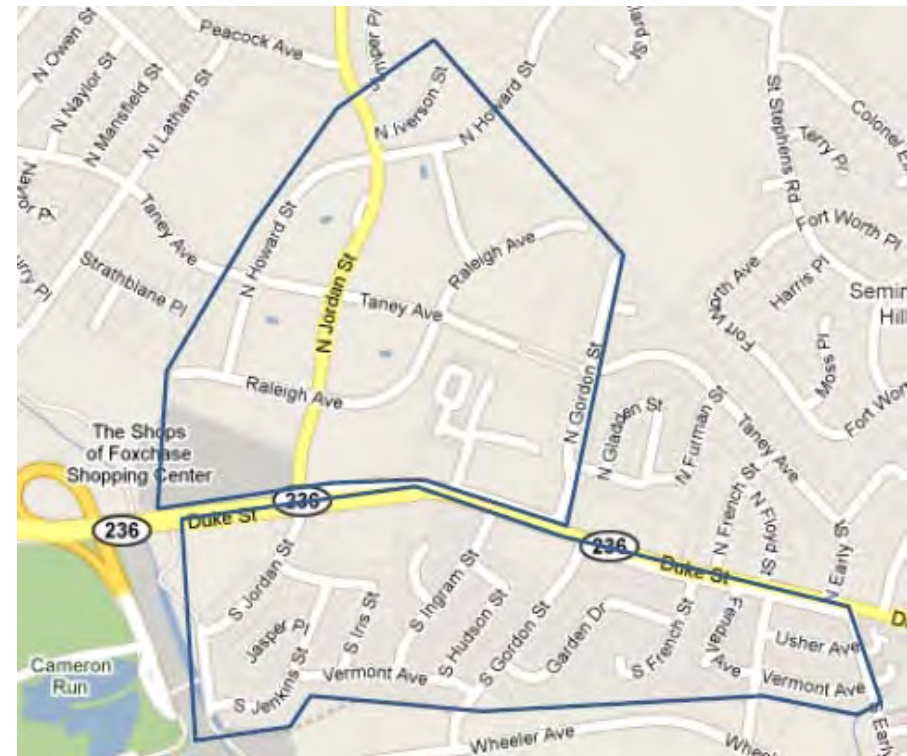
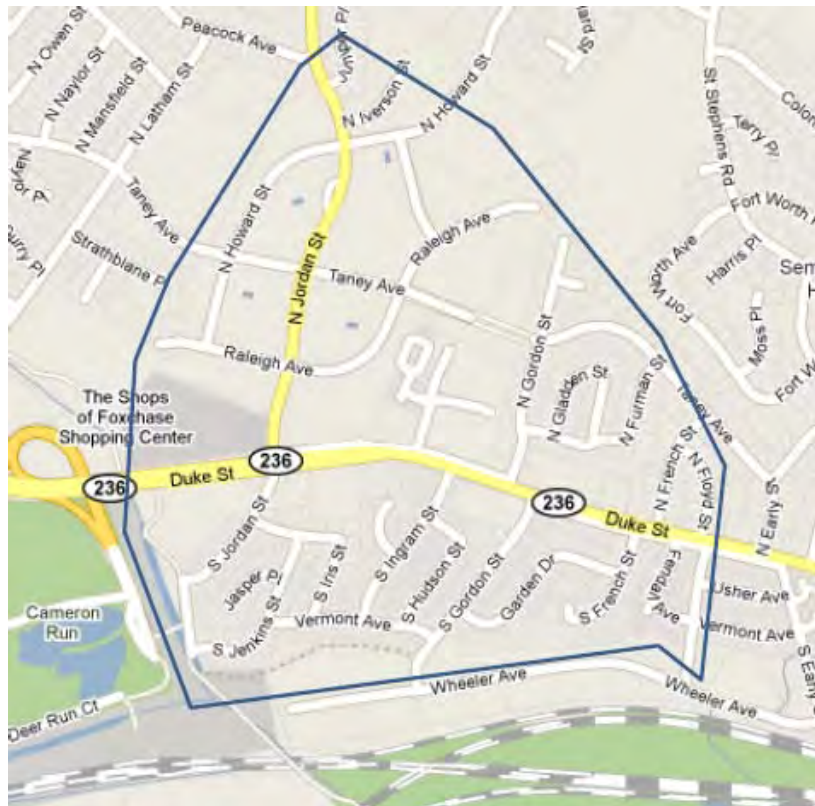
# GMU Hot Spots Experiment with LPR

*Question: How should LPR be used to maximize its crime reduction effects?*

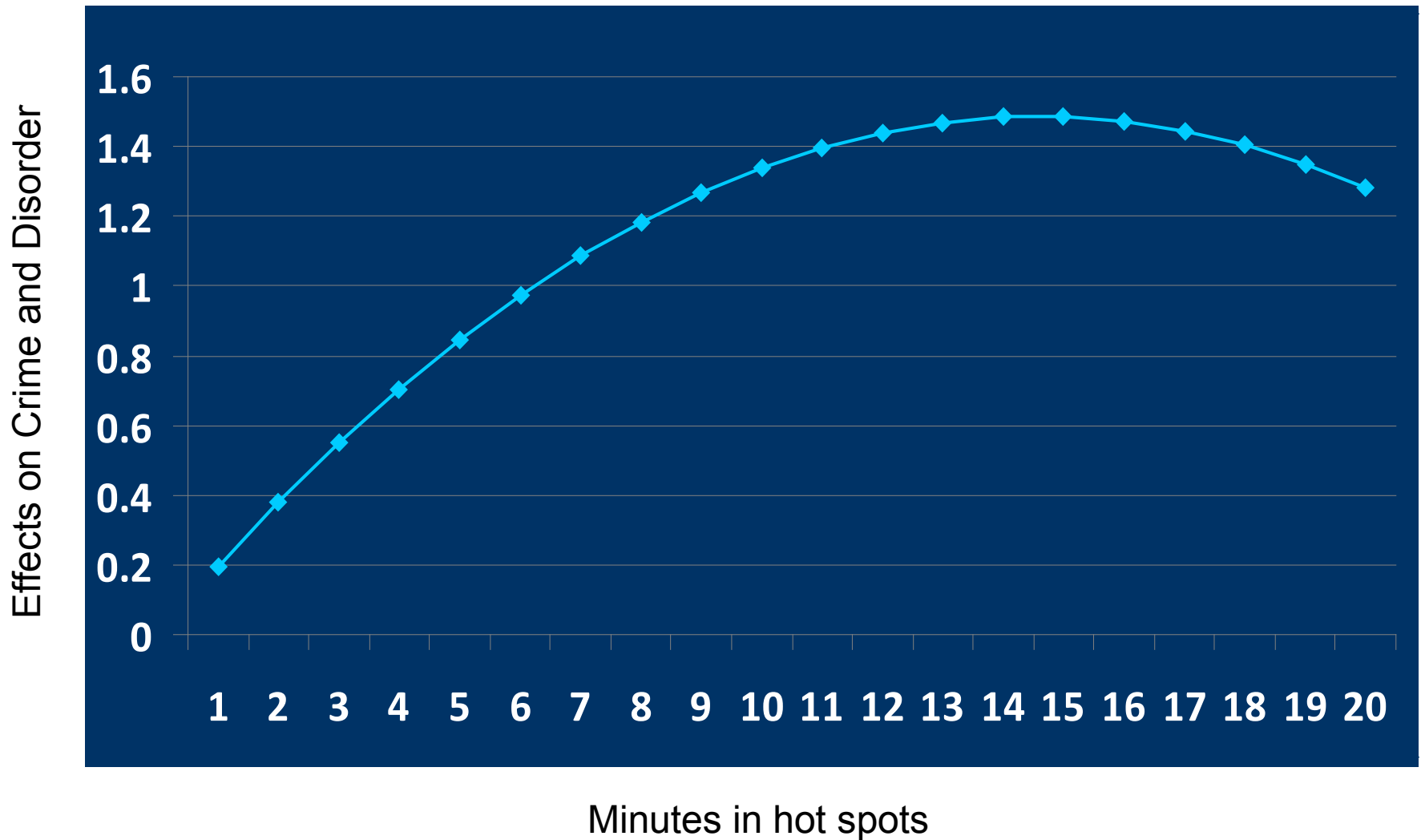




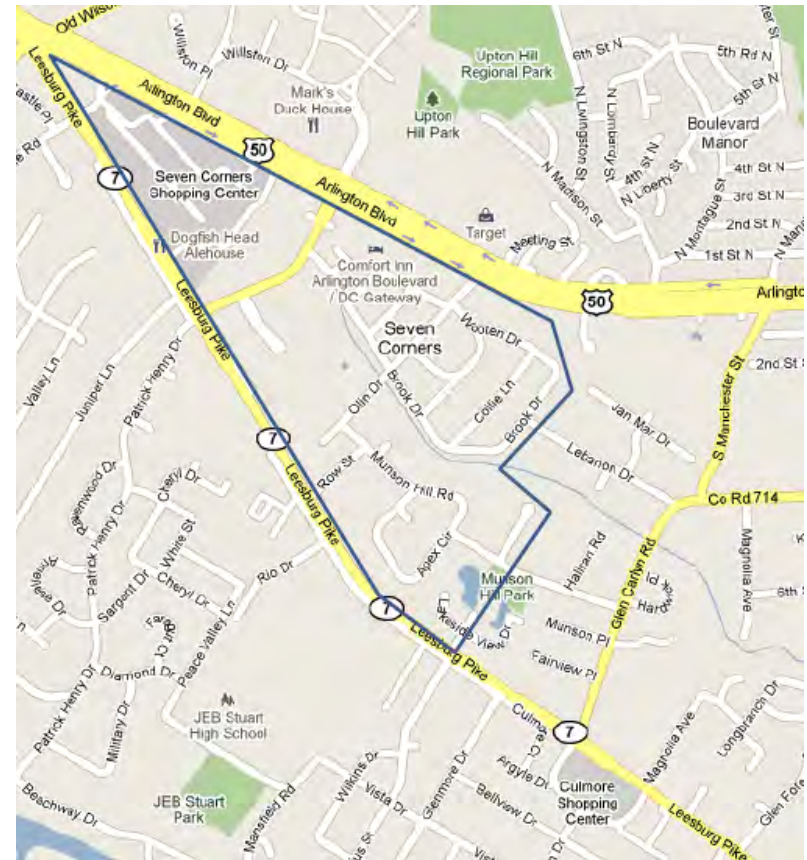
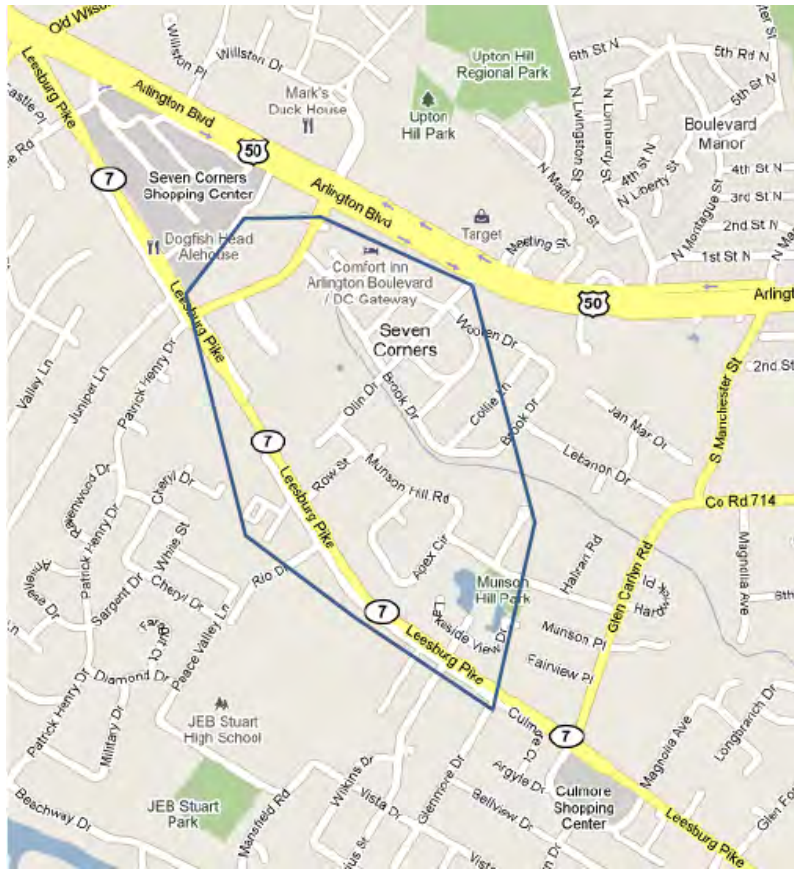
# Before and After Hot Spot Adjustment (A hypothetical Example)



# The Koper Curve Principle (Koper, 1995)



# Before and After Hot Spot Adjustment (Another hypothetical example)





# Notes from the 3 slides above

- ▶ Hot spots generated by GIS may be too large or not operationally sensible. The research team took every hot spot created from the GIS and then worked with the operational officers to readjust the boundaries of the hot spots based on a couple of specific criteria.
- ▶ The first criteria was whether an officer with an LPR unit could scan all cars in that area and drive through every street in the hot spot in under 30 minutes. 30 minutes was chosen because the Koper Curve principle indicates that the deterrent effect of police at hot spots decays over time (perhaps as early as 15 minutes).
- ▶ We choose 30 minutes, as opposed to 15 minutes discussed by Koper (1995), because we wanted a mixed approach to deployment in these hot spots. In other words, officers would have time to sweep the area in a mobile mode, and then have the discretion to use either a mobile or fixed mode to run tags. 30 minutes was a good compromise for this type of deployment.
- ▶ The second criteria in guiding officer adjustment of the hot spot boundaries was to consider possible environmental obstacles or areas that had not been included by the GIS that officers believed should have been.
- ▶ This hot spot readjustment became very important to the research team, because it meant that it combined a statistical analytic exercise – the generation of hot spots, with the realities of the operational units, to come up with hot spots that were generated from a combination of research and experience.
- ▶ The bottom line lesson to agencies developing their own hot spots: Develop small enough hot spots that are first based in the statistical and geographic analysis, that are then examined for environmental and operational feasibility for directed patrol in short (perhaps less than 30 minutes) increments of time.

# A Mixed Approach in the Hot Spots

- ▶ Mobile-unit scanning of the entire hot spot.
- ▶ Fixed-location scanning of multi-directional traffic.
- ▶ Application of Koper Curve Principle (limit time in hot spot).
- ▶ Sensitivity to the data available for access.



# Possible Community Concerns

- ▶ General “Big Brother” concerns
- ▶ Privacy of data, especially “gray areas” of deviance
- ▶ Storage of LPR–captured data for future investigations
- ▶ Proactive use of data for “fishing”

# Random Sample Survey: Questions

- ▶ Police legitimacy and service
- ▶ Knowledge about LPR
- ▶ Levels of support for different uses of LPR
- ▶ Attitudes toward data collection, storage and use by LPR
- ▶ How police could prepare the community for LPR deployment
- ▶ Demographic information about respondent
- ▶ Geographic information about household

# Summary Suggestions for LPR Use

1. LPR is only as good as the data behind it.
2. LPR deployment must occur in hot spots to optimize its effects.
3. The hot spots must be clearly defined, small, and operationally meaningful.
4. The Koper Principle should be applied.
5. The effects on community legitimacy must be gauged using valid methods and specific questions.

# Resources

The Evidence-Based Policing Matrix:

<http://gemini.gmu.edu/cebcp/matrix.html>

Ideas in American Policing (Police Foundation) explaining the Matrix:

[http://www.policefoundation.org/pdf/Ideas\\_Lum.pdf](http://www.policefoundation.org/pdf/Ideas_Lum.pdf)

One Page Research Summaries on hot spots, Koper Curve Principle, place-based policing, law enforcement, and other topics:

<http://gemini.gmu.edu/cebcp/OnePageBriefs.html>

Editorial on Efficiency vs. Effectiveness in Policing Technologies:

<http://www.scienceprogress.org/2010/02/police-technology/>

LPR Web Portal coming soon at CEBCP website.

<http://gemini.gmu.edu/cebcp>

